Doctor Kiskadden's mention of the full thickness graft for use when subsequent contraction is to be avoided as much as possible, prompts me to tell of an experience with a large full thickness graft which I employed in the popliteal space. A wax model for record was made a few weeks after the grafting operation, and several years later the patient was again seen. At this time another model was made and we were surprised to find that the second model showed that the full thickness skin graft had enlarged about 20 per cent. The graft was crossed by numerous striae atrophica with an appearance very similar to the striae gravidarum. Quite evidently the full thickness graft had been stretched by the retraction of surrounding scar.

The subject-matter brought out in a paper on skin grafting is ever new, because each case requiring plastic relief of a scar deformity is usually a problem in itself and must be so attacked. The subject cannot be dismissed by generalizations.

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WILL L. MILES, M. D. (822 Pacific Mutual Building, Los Angeles).—The author's recommendation of early split skin grafting preparatory to some other type of later repair is, I believe, an excellent one. This type of graft may be employed with all expectancy of a successful take during the early stages of healing when any other type of repair might be either impossible or inadvisable due to the presence of a low-grade infection. Too often we are inclined to postpone all repair until we are certain that an absolutely clean granulating base entirely free from infection is present, only to find that serious contracture has resulted, making the repair more difficult and prolonging convalescence. Thiersch split skin grafts, when properly applied, will survive and give a remarkably high percentage of takes even when planted on a very poor or mildly septic soil. An exception to this is the occasional case of low-grade infection, which is marked by the presence of *Bacillus pyocyaneus*. My experience has been that when this organism is present it is useless to attempt any type of graft as failure will invariably result; the graft melting away completely in a flood of green pus.

INFECTIONS OF THE GENITO-URINARY TRACT*

By MILEY B. WESSON, M. D.
San Francisco

DISCUSSION *by Thomas W. Bath, M. D., Reno, Nevada; Burnett Wright, M. D., Los Angeles; Lloyd Kindall, M. D., Oakland.*

PRACTICALLY every member of this society is interested in the treatment of diseases of the genito-urinary tract, and rarely a day passes but what the post brings to him a circular letter extolling the merits of some drug that will "cure" all such infections. It has long been an axiom of therapeutics that any disease with numerous sure cures is frequently impossible to cure, and urologists subscribe whole-heartedly to this dogma.

Genito-urinary lesions manifest themselves from the cradle to the grave. The pediatrician has to deal with pyelitis and bed wetting, and the general practitioner is annoyed with the "strains" of wild youths and the "honeymoon appendicitis" of the female adolescent, to say nothing of the women who have "colds in the bladder" or "weak kidneys." And, of course, we are all familiar with the old man who has spent the first part of his life making money and the latter part trying to make water. The world's greatest surgeons, including Sir John Hunter and Dr. William S. Halsted, have been intensely interested in this field, and it is for this reason that it has reached its present stage of scientific precision.

DIFFICULTIES MET WITH IN PRACTICE

With the advances in the refinements of bacteriology and laboratory technique, we poor practitioners of medicine are enmeshed in a mass of exceptions to the generally accepted rules. Theoretically, urine smears and cultures should always agree, but in a study of three thousand routine cultures from the urological clinic at Johns Hopkins Hospital, it was found that smears and cultures agreed in only 64 per cent of the cases. Gram-negative bacilli of the proteus and colon group with staphylococci present no difficulties to the bacteriologist. When in such numbers as to show in smears, they are easily cultivated in carbohydrate broth and agar; streptococci need an enriching medium of blood and serum agar and must be transferred to such when seen in smears. As was expected, many organisms were found in the cultures that did not show in the smears, due to their scarcity; however, in practically 6 per cent of the cases organisms were seen in the smears and the cultures were negative.

A number of explanations are possible: (1) The organisms were dead from the action of antiseptics; (2) artefacts and not organisms were seen; (3) organisms seen in epithelial cells are usually nonviable; (4) a special medium was needed; or (5) the cultures were not properly protected from light, cold, and air. A Gram-negative, nonsporulating bacillus was found that was so sensitive in its oxygen requirements that it was killed by exposure to the air in from forty to one hour and fifteen minutes.

In a series of 600 bladder infections they found that 351 were infected with colon-group organisms, and of these 253 were found in pure culture. The staphylococci were found in 265 cases and 122 were in pure cultures, while there were 67 cases of streptococci, 30 of which were obtained in pure cultures. A parallel study of kidney infections showed a lower incidence of colon bacilli, but a much greater increase in staphylococci and proteus, B. pyocyaneus and organisms of the paratyphoid group. In 203 patients with blood stream infections, there were 104 cases of the colon group, 27 staphylococcus, 18 proteus, etc. The mortality for the proteus group was 55 per cent. This is rather surprising to those of us who were taught in the bacteriology laboratory to look with contempt upon this organism.

The difficulty of completely eradicating infections of the genito-urinary tract is due to the fact that the bacteria have usually penetrated so deeply that local treatment, whether of the urethra, bladder or the kidney pelvis, usually fails to reach the depths of the infection. In the use of antiseptics we must always remember to keep the dilution as low as possible so as to do no tissue damage. Oral medication, as a whole, has been a failure. Intravenous chemotherapy, protein and

* Read at the twenty-ninth annual meeting of the Nevada State Medical Association, Reno, Nevada, September 23-24, 1932.

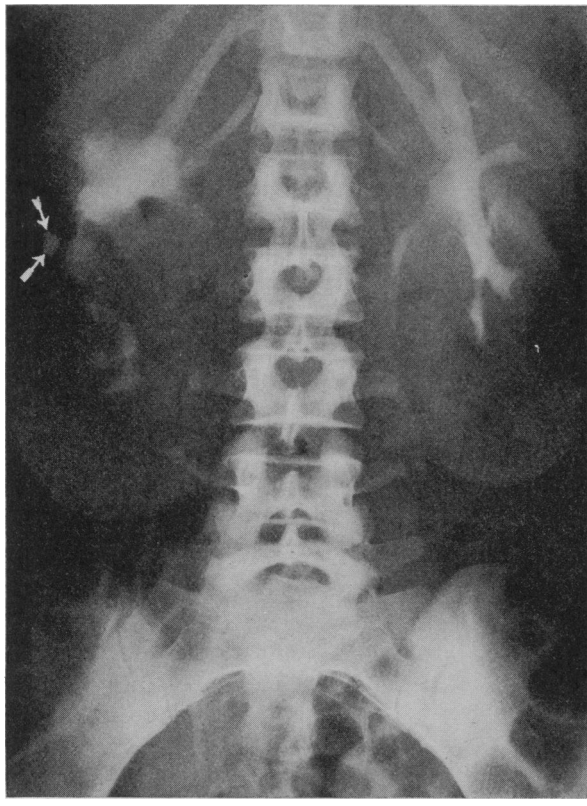

Fig. 1.—May 24, 1932. Intravenous neo-iopax (fifteen minutes) with catheters plugged. Bilateral polycystic kidneys; stone in middle calyx of right kidney; no evidence of dilatation or destruction of calyces of left kidney.

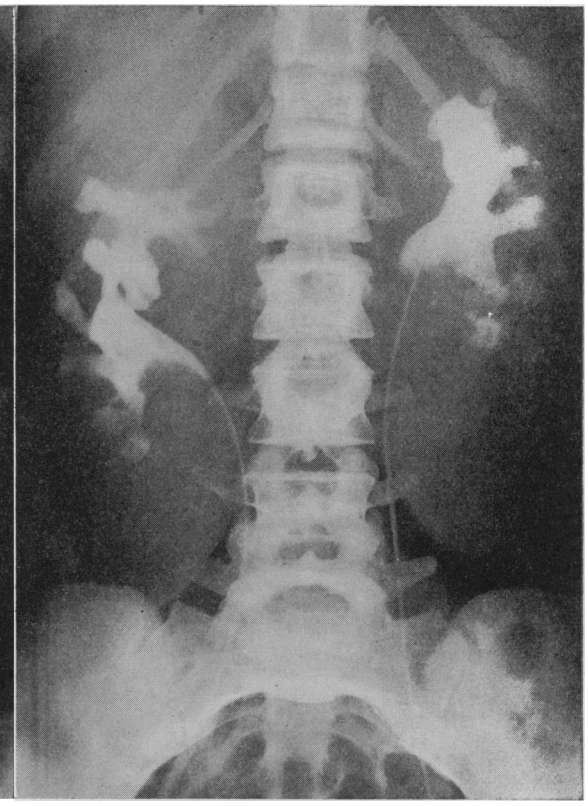

Fig. 2.—July 19, 1932. Retrograde pyelograms (13½ per cent sodium iodid by gravity). Note increase in size and amount of destruction of both kidneys.

serum therapy, both specific and nonspecific, and shock therapy have been of some help.

GONORRHEA

Many cases are cured spontaneously. Twenty years ago patients were advised to spend ten days in bed on a bland diet and drinking only alkaline water, while over two thousand years ago the infected ones were ordered to sit in the bed of a river below the town, facing upstream. However, organisms that invade deep crypts and distant organs may remain dormant for years; how many, we do not know. Henry G. Bugbee of New York City told me that he had a patient who, he was sure, had carried the same infection twenty-six years, while Edward L. Keyes says that after about two years it is up to the man to prove that he has not a reinfection. I have a patient who still has his gonorrhea of ten years ago, but it has probably been reactivated by transferring it back and forth to his wife many times. She has had two children during this time and the gynecologists were never able to determine the cause of her profuse leucorrhoea. He had a periurethral duct along the dorsum of the urethra, which I destroyed with a cautery, thereby destroying the "hibernating" den.

I have cured twenty-one patients of acute gonorrhea with one treatment by using a bladder irrigation (gravity) of 1-2000 acriflavine (Boots) (1-1000 acriflavine causes soft strictures, which are easily destroyed by a single passage of a sound.)

Montague L. Boyd of Atlanta, Georgia, injects a similar preparation into the urethra of a recumbent patient, wraps the phallus in pads of cotton, and has him remain in that position until he has to void.

Edgar G. Ballenger of Atlanta, Georgia, injects 5 per cent argyrol into the urethra and seals the meatus with collodion for six or eight hours. He lays great stress on the necessity of using white collodion, as the yellow will not hold.

Injections of zinc sulphate and lead acetate mixtures, five per cent argyrol, or one-half per cent protargol, are commonly dispensed by the druggists, while physicians prescribe reargon or one-half per cent lunosol (colorless). There is probably little difference in the action of the various silver salts, but no patient is going to pay a doctor for a prescription, and like it, which he can get free from the dispensing pharmacist. Potassium permanganate has been popular since the days of Valentine. It is not antiseptic in a concentration less than 1-2000, whereas the tissues will not tolerate more than 1-4000. Consequently the irrigations have no antiseptic properties, but are very valuable as an astringent and to clean up pus, while the injections are, of course, valueless as gonococcocides.

Sandalwood oil, oil of copaiba, santal midys, etc., have no antiseptic value, but tend to prevent strangury. They make the urine bland, but generally upset the stomach. A tincture of hyoscyamus and potassium citrate mixture will accomplish the

same result and not unduly disturb the digestive tract.

Hugh H. Young uses a combination of local treatment and intravenous therapy in all cases of gonorrhea, even when the infection is only a few hours old. Intravenous therapy has no effect on organisms in the urethra, the lumen of which is not reached by the blood stream. The vaccines have no specific value, but act merely as a form of protein therapy, and typhoid vaccine is more widely used than is the gonococcus vaccine. For intravenous therapy he advocates 13 to 20 cubic centimeters of one per cent mercurochrome, or small doses of neosalvarsan, and reports that fifty-five per cent of his cases of acute and chronic gonorrhea are sterilized after one or more intravenous injections.

In his gonorrheal arthritis series of twenty-four cases, there was quick amelioration of the joint condition in all cases and the complete cure of the gonorrhea and its complications in fifteen cases.

INFECTIONS OF URINARY TRACT DUE TO BACTERIA OTHER THAN GONOCOCCUS OR TUBERCLE BACILLUS

All other infections in the urethra, bladder and pelvis of kidney, acute in character, are easily disposed of by simple antiseptic irrigations or injections, provided all obstructions to free drainage are removed. Many such infections are self-limiting, or autosterilizing. This is not true when infection is in the prostate, seminal vesicles and renal cortex, or medulla. Internal urinary antiseptics such as methenamine or niazo may be helpful. (I have obtained no results from pyridium, serenium, acriflavine, or caprocol.) Occasionally, salting out colon bacilli, *i. e.,* alternating the reaction of the urine between acid and alkali, is of value, provided the hydrogen ion concentration, when acid, ranges from 4.6 to 5, and when alkaline varies from 9.2 to 9.6. At these levels there is an inhibition of colon bacilli growth whose maximum development takes place at pH 6 to 7. At the Mayo Clinic they accomplish this by means of the ketogenic diet, for with its increase in fats and decrease in carbohydrates the hydrogen ion concentration theoretically quickly drops below 5, and a state of ketosis ensues. I have two obstinate cases of pyelitis, or pyelonephritis, in the hospital on this diet at the present time. One patient has been taking it six weeks and the other three weeks, and the colon bacilli seem to enjoy the diet, but the subjects are objecting. H. C. Bumpus, Jr., in a personal communication, says that they do not hospitalize their patients, and that they keep them on the diet only one week.

Intravenous and chemotherapy are of value in some of these cases. Neosalvarsan is considered by many to be almost a specific for a coccus infection, while 10 to 20 cubic centimeters of one per cent mercurochrome sometimes act the same way with a bacillary infection; acriflavine has given good results in the hands of some, and preparations of hexamethylenamine are popular. Salihexin (A. D. R.) is widely used, and two

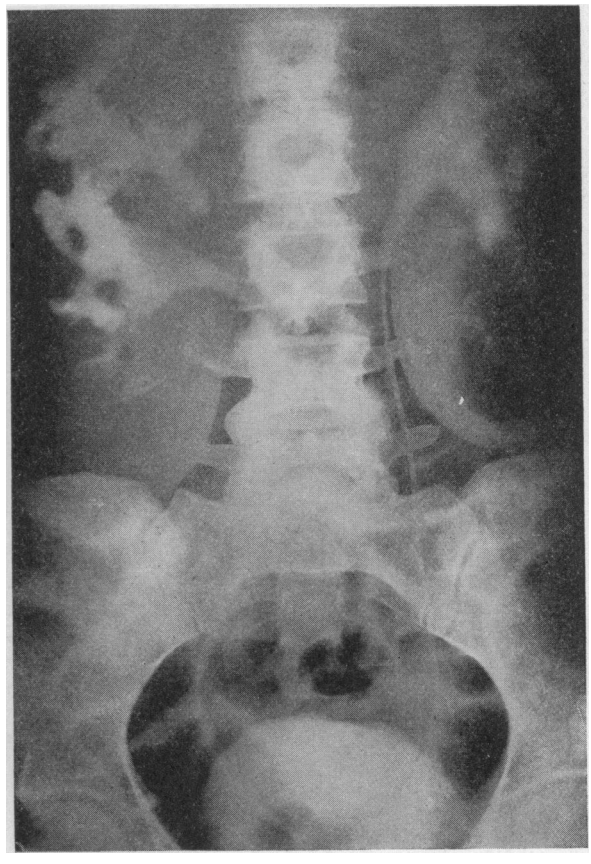

Fig. 3.—Combination pyelograms made by injecting neoskiodan intravenously and 13½ per cent sodium iodid by gravity through the catheters.

years ago the Mayo Clinic was interested in the use of cylotropin (Schering), which consisted of hexamethylene-tetramin grains xxx, sodium salicylate grains xii, and caffein sodium salicylate grains iii, in aqueous solution.

Bacteriophage is theoretically a perfect cure-all, as it acts in three ways: (1) specific, (2) vaccine effect, and (3) nonspecific, or foreign protein action. It is a transmissible bacterial lysin which regenerates at the expense of the living growing bacteria, which it dissolves; or, stated another way, it is a parasitic virus, a definite entity, that grows only in the presence of a particular strain of germs, which it destroys by dissolving. The commercial "phage" is of questionable value because of the large number of strains of bacteria and the improbability of the proper parasitic virus for your particular germ being present in the proprietary package. Dr. E. W. Schultz, professor of bacteriology at Stanford University, prepares the material used in San Francisco, and he told me yesterday that he would do it for you, provided you send him pure cultures of the organisms by air mail. But you must send him reports of your results each time; otherwise you get no more "phage," for he wants to determine the clinical value of bacteriophage. (Incidentally, the cost is ten cents per cubic centimeter.)

I have not had any startling cures, but I continue to use bacteriophage on every obstinate case of pyelitis, and probably the reason why I do not

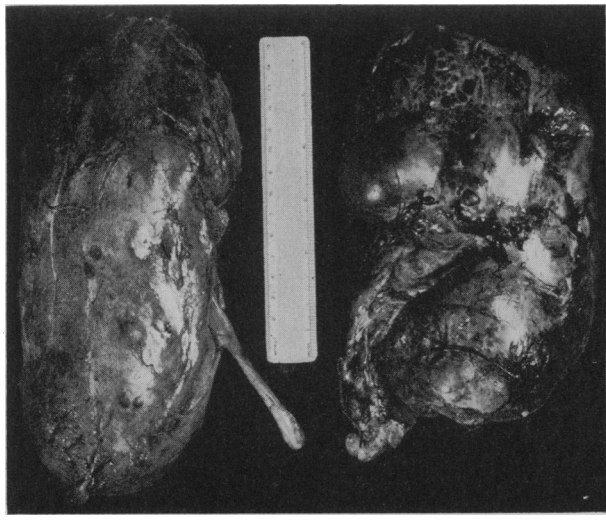

Fig. 4.—Kidneys at autopsy. Left kidney weighed 1,025 grams and measured 22 x 9 x 10 centimeters, while right kidney weighed 950 grams and measured 18 x 9 x 11 centimeters.

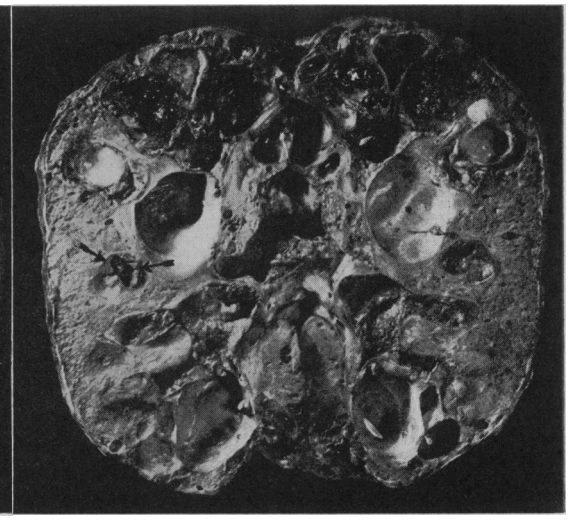

Fig. 5.—Right kidney. The stone lies in the tip of the middle calyx. The nephrotomy drainage incision entered the pelves through a large cyst in the middle. The myriads of cysts of both kidneys were essentially alike.

get the "cures" reported by others is, that I always wash out my patients a few times with one per cent silver nitrate, 1-10,000 merthiolate, or one per cent mercurochrome, and the drugs or the mechanical passing of the catheters cures all of my easy cases, so I do not use bacteriophage on them.

My technique for bacteriophage is to inject about 10 cubic centimeters in each kidney pelvis and about 40 cubic centimeters in the empty bladder and keep the patient quiet in bed for forty-eight hours with the foot elevated ten inches. If the patient is very sick I leave in the ureteral catheters and inject 5 cubic centimeters of "phage" every four hours for ten doses. Every second day I give 1 cubic centimeter intradermally or subcutaneously, for the immunizing action. The intravenous injections of 0.1 cubic centimeter in 10 cubic centimeters saline I stopped, because temperatures of 106 degrees annoy me. The reactions were thought to be due to the proteose media carried over, and Doctor Schultz is trying a new media. If he can make a preparation so that 50 cubic centimeters of "phage" can be safely injected into the vein, then the blood can carry the parasitic virus to every part of the kidney and we will get results. In one patient I instilled 200 cubic centimeters of "phage" in the rectum and the blood that was collected one hour later, when diluted one hundred times, induced lysis in cultures, but probably not in an effective concentration, therapeutically speaking.

I want to report in detail one case of so-called pyelitis—really pyelonephritis and pyonephrosis—that demonstrates how little we know about treating such an infection.

REPORT OF CASE

F. G., female, twenty-nine, married. This patient was apparently in perfect health when she consulted an eminent gynecologist to see why she had not been pregnant although married for four years. On March 1, 1932, she had an appendectomy and hysterectomy. She entered the hospital with an uninfected urine, and four days later her urine was filled with pus. During the interim she was catheterized four times. At the end of ten days she was discharged from the hospital, but her surgeon continued to treat her bladder with argyrol injections twice a week and gave her urotropin by mouth.

I first saw her on May 21, 1932. She complained of pains in the right side, occasional twinges in the left, had a normal temperature in the morning, and an afternoon elevation of 101 degrees. The surgeon said that at the time of the operation her kidneys were normal in size and there had been very little enlargement up to the time I saw her.

On May 22 I cystoscoped her. Both kidneys were enlarged and infected, and there was a normal function on the left and a reduced one on the right. There was a small stone in the right middle calyx and considerable destruction of the upper calyx (Fig. 1). Niazo tablets by mouth were prescribed. The cystoscopy stirred up her infection, and her afternoon temperatures were about 104 degrees. Four days later retention "gold catheters" were put in her kidneys, and these were irrigated every two to four hours with various dilute antiseptics—1 per cent mercurochrome, 1-10,000 merthiolate, 1 per cent silver nitrate and boric acid. On May 27 I injected, intravenously, .6 gram neosalvarsan and the next day her temperature rose to 105 degrees. On May 30 I injected, intravenously, 10 cubic centimeters of 1 per cent mercurochrome with no reaction, and two days later the maximum temperature was 98.6 degrees. On June 2 her temperature was 101.6 degrees, and so I gave 15 cubic centimeters of 1 per cent mercurochrome and one hour later she had projectile vomiting, but the temperature went down so that three days later the maximum elevation was 0.3 degrees.

It looked as if I was about through, so on June 10 I started bacteriophage to finish the case. All other medication was stopped, daily the kidneys were lavaged with the "phage," and she was given immunizing doses subcutaneously. On the third day her temperature was 105 degrees. Bacteriophage (one-tenth cubic centimeter in one cubic centimeter salt solution) was injected intravenously and she had a proteose reaction, with evidences of circulatory failure, which was controlled by hypodermic injections of adrenalin. Two days later her temperature was normal.

The temperature remained practically normal, but the patient became more anemic and the kidneys increased (Fig. 2) in size until they extended from the diaphragm to below the brim of the pelvis, in spite of

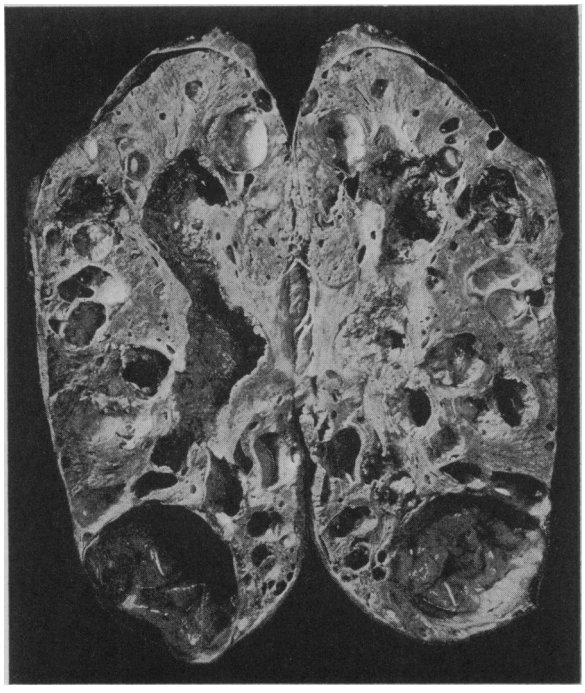

Fig. 6.—Left kidney. Note the large cyst, 7 centimeters in diameter at lower pole, and numerous other cysts scattered throughout both cortex and medulla of sizes varying from 2 to 5 centimeters. Some were filled with clear jelly-like material, while the contents of others were white and opaque.

the daily lavages with bacteriophage. Intravenous neoskiodan gave very poor pictures, even though films were made up to one hour and fifteen minutes, demonstrating that there was very little function.

In July 11 the temperature rose to 103.5 degrees so I tried 12 cubic centimeters of one per cent mercurochrome intravenously, and there was no reaction. On July 14 the temperature was normal, the red blood count was 4,500,000, and the hemoglobin 40 per cent. Shortly thereafter a foul slough began to pass from the bladder. She was transfused six times within the next month, and when she was not able to take 3,000 cubic centimeters of water per day by mouth, it was given subcutaneously. Blood cultures were normal throughout and urine cultures showed colon at all times, and at one time there was streptococcus.

On July 26 a projecting hard lump appeared on the right side which extended across to the umbilicus. The interns and nurses maintained that this decreased in size with colon irrigations. A picture showed increased destruction of the upper calyx (Fig. 3). Since perinephritic abscess was still a possibility in the minds of some of the consultants, it was decided to expose the kidney and do a nephrotomy, leaving in a large rubber tube. A characteristic polycystic kidney was found with many purulent cysts that were punctured.

Five days later her nonprotein nitrogen was 74 milligrams and the creatinin 2 milligrams. After forty-eight hours of coma, she expired August 9, 1932, and the kidneys were removed through the operative incision. The right weighed 925 grams and the left, 1,050 grams (Figs. 4, 5, and 6).

COMMENT

Considering the fact that the surgeon reported her kidneys normal in size at the time of operation five months before, and my various pictures showed that they gradually increased in size, there was a possibility that they were due to cystic dilatation from inflammatory reaction and were not true congenital polycystic kidneys. Microscopic sections showed that all cysts, irrespective of size, were lined with a single layer of epithelial cells, and every transition in cyst size and in degrees of epithelial flattening could be found. Hence, the origin of the cysts from nondischarging, dilating tubules was obvious.

The theory of congenital origin assumes a developmental failure in fusion of the renal and pelvic portions of the kidney units or the production of an excess number of the renal elements. Such cases develop in the first year of life, and in many instances are associated with accompanying cysts of the liver or pancreas or with other developmental defects and anomalies. My patient showed no congenital anomalies or other cysts. Also, cases in which cyst formation represents the outstanding kidney pathology, and with little or no associated infective or inflammatory change, belong in this group.

The other theory, and the logical one in this case, is that the blocking of the tubules and consequent cystic dilatation is secondary to the intense inflammatory reaction, edema, and plugging of the larger tubules by the pus cells. Following her pelvic operation, there was undoubtedly an acute flare-up of this preëxistent kidney infection, with resultant inflammatory plugging and compression blocking of the tubules, and eventually the formation of dilated tubule cysts and consequent enlargement of the kidneys.

Every form of therapy was tried except reducing the hydrogen ion concentration by means of a ketogenic diet, and this is not a practical diet for a very sick patient. We have no specific therapy for pyelonephritis or other severe genito-urinary infections.

490 Post Street.

DISCUSSION

THOMAS W. BATH, M. D. (Reno, Nevada).—It is certainly refreshing to hear Doctor Wesson say in the concluding sentence of his first paragraph that "any disease with numerous sure cures is frequently impossible to cure." The general practitioner follows in the line of the specialist with reference to the advertised remedies that are blazoned before the medical public extolling their curative virtues, especially in specific diseases of the genito-urinary tract; and the physician who follows up his cases, and after having tried to cure with them, feels disgusted. For in spite of his most ardent endeavors the patient, shortly after his discharge as cured, frequently returns to his physician with the same old complaint.

We might well endorse the statement of Ricord, who in 1838 published his results after he had inoculated more than twenty-five hundred human beings to determine the difference between syphilis and gonorrhea. The dictum promulgated by Ricord, that "Man knew when it (gonorrhea) begun, but God only knew when it ended," is a scientific observation made a century ago with which the modern urologist and general practitioner will heartily concur.

Many physicians, in examining either men or women, if they fail at first in finding the specific coccus, dismiss the patient with a single examination and oftentimes with a certificate certifying "That upon careful examination they have failed to find that Mr. or Madam X was afflicted with the gonorrhea." Certainly a foolish statement! After they have had years of experience endeavoring to chase the festive gonococcus from its hidden recesses in the racemose glands of the urethra or the cervix or other places capable of hiding away the illusive germ, they will eventually

learn that clinical symptoms of discharge of white and glairy mucus from either man or woman should arouse suspicion that the individual, until further proved to the contrary, is suffering from gonorrhea.

Cross infection between man and woman will result in disaster more often to the woman unless extreme radical measures are taken. A large per cent of the operative cases on women of the child-bearing age are a direct result of venereal infections. Swollen ovaries, pus tubes, inflamed cervices, inflamed Skeen's glands, inflamed Naboth's glands, intermenstrual bleeding, ectopic pregnancies—all are characteristic of the old and still very applicable term, "pelvic cellulitis." Such is the picture that the clinician sees, and a radical operation done on the woman for cure frequently results in sterilization. The willingness of the modern male to offer up the woman on the sacrificial altar of science is exactly in keeping with the ancients, who used woman as a sacrifice to their deity. When all the sources of infections are destroyed, there is a possibility that the woman will regain her health, but at the expense of her fecundity. The woman pays. The man possibly will survive.

Until some really curative medication is found I think Doctor Wesson's allusion to the ancients who sat in the warm waters of the stream seeking purification is about as good a treatment as any. However, we will continue to try, trusting to find the sesame which will be the fruition of our hope and endeavor.

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BURNETT WRIGHT, M. D. (727 West Seventh Street, Los Angeles).—Doctor Wesson's paper has touched on many phases of the broad subject of urinary tract infections. He frankly admits the disappointment that is common to all who are seeking for the drug or the method that will be universally successful in sterilizing an infected urinary tract.

It is unlikely that any agent will be found that can be taken by mouth and excreted in the urine in such concentration as to cause complete sterilization when definite obstruction to free drainage is present. If stagnation of urine and remote foci of infection could be excluded, the treatment of nongonorrheal and nontuberculous urinary tract infections would require little consideration. We believe urinary obstruction to be the most important single factor in the production and maintenance of urinary infections of the type under discussion. Often it is no more than a narrowing of the lumen of the urethra or ureter (too small at best) by a transient edema that responds readily to dilatation and irrigations or subsides spontaneously and a cure is effected. Many such cases are unrecognized and are self-limited or autosterilizing, as Doctor Wesson says. When a definite and lasting obstruction is present, its recognition and removal by appropriate means is of first importance. When this has been accomplished, a careful search for remote foci of infection should be made and every effort put forth to eradicate them. By cleaning out these nests of bacteria the treatment directed toward sterilizing the urinary tract benefits (*a*) by a reduction in the number of organisms carried to the kidneys in the blood stream; (*b*) from a raising of the natural immunity by reducing the volume of infection; and (*c*) in a general improvement in health.

Obstructions in the upper urinary tract, especially when unilateral, may exist for a long time without symptoms, until infection occurs. Many are now being found by intravenous urography, and a great deal can be done in the way of preventing future urinary tract infections if they are corrected. This applies especially to children.

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LLOYD KINDALL, M. D. (400 Twenty-ninth Street, Oakland).—Doctor Wesson's case report illustrates the type of infection we get occasionally that is discouraging because the various recognized methods of treatment fail.

The patient's bladder was infected with colon bacillus when a catheter was passed into the bladder. This was followed by daily elevations of temperature. Upon urologic investigation two and a half months later, both kidneys were found to be enlarged, a calculus in the right middle calyx, and destruction of the right upper calyx. What a marked pathologic change in so short a period of time! And remember, these changes progressed without trauma from ureteral catheters or pressure from sodium iodid solution. The kidneys continued to enlarge, several standard treatments were given, and the patient died five months after the beginning of the infection, the kidney being greatly enlarged from infection and cysts.

I feel that this patient would have died irrespective of any treatment given. Our first principle in the treatment of pyelonephritis is correcting stasis any place along the urinary tract. This patient had stasis in the kidney parenchyma because of the rapid increase in the size of the cysts; possibly the parenchymal infection stimulated the cysts to activity.

Doctor Wesson states that we have no specific treatment for pyelonephritis, which is true. Many patients get well by correcting stasis, forcing fluids, rest, and changing the reaction of the urine. The more persistent cases are frequently improved or cured by pelvis lavage and intravenous medication. Bacteriophage therapy helps to cure many of these infections. Stock "phages" sold by commercial houses remind me of the old "gunshot" prescription, hoping that one of the ingredients will cure the disease. Bacteriophage should be made from the patient's own culture and should not contain antiseptic preservatives of such strength as will interfere with the effectiveness of the product. From statistics collected by Dr. E. W. Schultz of Stanford University in the treatment of pyelonephritis by phage therapy there were 87 per cent cures in the acute cases, while in the chronic cases there were 28 per cent cures and 50 per cent of cases improved. These figures give us encouragement in the future possibilities of phage. To make the autolysed phage effective it must come in contact with the organisms, hence the large percentage of cures in the acute cases. In the chronic cases, phage injected into the pelvis does not come in contact with the organisms that have penetrated deeply into the tissues of the pelvis and parenchyma, but phage injection subcutaneously helps to develop immunity by the dissolved bacterial proteins. Intravenous phage therapy would be ideal if it could be given in large or concentrated doses without reaction. This reaction, even in small doses, is sometimes severe, but we must remember that some patients are sensitive to most any type of intravenous therapy. The phage itself is harmless, but the associated proteins and salts may on occasion give reaction. Work is being done at the present time in purifying phage solutions for intravenous therapy. Doctor Schultz told me that, to date, investigators in the field of bacteriophage had barely scratched the surface and it is hoped that funds will be available for these scientists to continue their investigations.

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DOCTOR WESSON (Closing). — There is no specific therapy for pyogenic infections of the genito-urinary tract. In the treatment of these diseases the physician must keep constantly in mind the axiom that a good doctor is one who does his patients no harm. Furthermore, if there is a "quick cure" we must not neglect to give part of the credit to Madam Nature and part to the patient's ancestors, who endowed him with a resistant constitution.

For control of the severe infections, our hope lies in the development of bacteriophage therapy. This will require a combination of a scientific bacteriologist with vision (like Doctor Schultz) and a skeptical clinician with a large charity service of genito-urinary infections; and so far no study by such a team has been made. The average bacteriophage statistics are no more dependable than are those concerning the various dyes given by mouth that apparently "cure" everybody's patients but mine.